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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/990,880	11/21/2001	Andrew Karellas	301506.3001-100	2218

30407 7590 04/23/2003

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EXAMINER
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THOMAS, COURTNEY D

ART UNIT	PAPER NUMBER
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2882

DATE MAILED: 04/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)	
	09/990,880	KARELLAS ET AL.	
	Examiner	Art Unit	
	Courtney Thomas	2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 21 November 2001.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-29 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

### Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                  | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                         | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>5</u> . | 6) <input type="checkbox"/> Other:  |

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## DETAILED ACTION

### *Specification*

1. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

### *Claim Objections*

2. Claims 20-29 are objected to because of the following informalities:
3. Claims 20-29 are cited as being dependent on method claim 18. Examiner notes that claim 18 is drawn to an apparatus.
4. Appropriate correction is required.

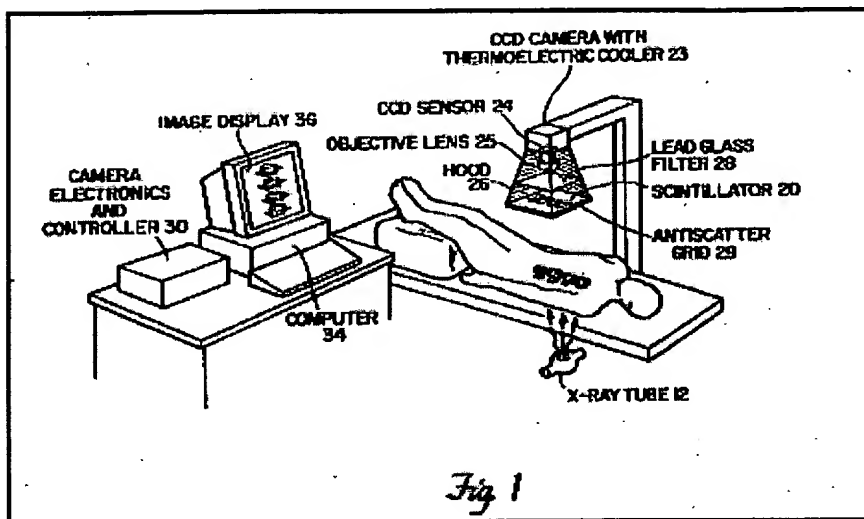
### *Claim Rejections - 35 USC § 103*

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Karellas (U.S. Patent 5,150,394) in view of Karellas (U.S. Patent 5,572,034).

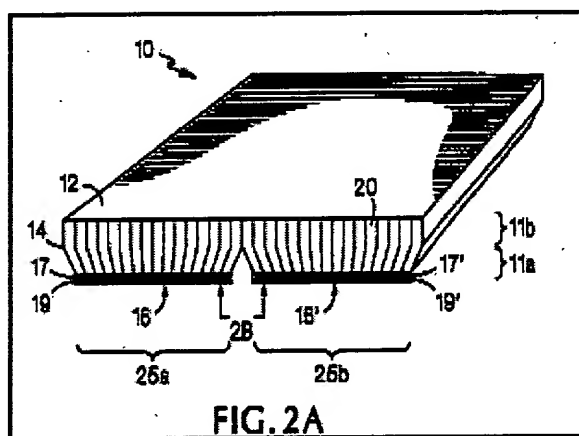
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7.

Figure 1 - U.S. Patent 5,150,394 to Karellas

8. As per claims 1,13,19,21 and 23, Karellas discloses an apparatus and method comprising a source (12) a scintillator (20), a binning image sensor (24), and controller (30) electrically connected to the imaging sensor, the controller actuating readout of the electronic representation from the imaging sensor. Karellas does not explicitly disclose an apparatus comprising a non-reducing optical coupler or a straight fiber optic coupler between the optical surface and the imaging sensor.



9.

Figure 2A - U.S. Patent 5,557,034 to Karellas

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10. Karellas teaches the use of non-reducing optical couplers (14) in imaging systems for delivering light exclusively to corresponding detector regions (17). Additionally, Fig. 2A illustrates straight fiber optic coupling between an optical surface and imaging sensor as noted above. Benefits of such construction include the reduction of cross talk among detection elements and the ability to generate seamless images due to the separability of information received by the optically active regions of the corresponding detection elements (column 2, lines 18-39).

11. It would have been obvious to modify the apparatus of Karellas such that it incorporated non-reducing optical couplers. One would have been motivated to make such a modification so that cross talk among detection elements are reduced and for enabling an imaging system to generate seamless images due to the separability of information received by the optically active regions of corresponding detection elements as taught by Karellas ('034)-(column 2, lines 18-39).

12. As per claims 2 and 3, Karellas does not explicitly disclose an apparatus comprising a display for displaying an image of cardiovascular or soft tissue.

13. It would have been obvious to modify the apparatus of Karellas such that it incorporated a display for displaying an image of cardiovascular or soft tissue. One would have been motivated to make such a modification so that tissue contrasts within a region of interest could be visualized and used for medical determinations.

14. As per claims 4 and 22, Karellas as modified, discloses an apparatus wherein the sensor comprises a CCD that includes a plurality of interpixel channels (column 6, lines 5-16; see Fig. 1 above).

15. As per claims 5, 17 and 20, Karellas as modified, does not explicitly disclose an apparatus wherein the CCD comprises a plurality of CCDs, each having a plurality of surfaces that interface with an adjoining CCD.

16. Karellas ('034) teaches that imaging systems employing a plurality of interconnecting CCDs are useful in capturing information larger than a single detector system. A benefit of such construction is the generation of high quality images not possible with singular detection schemes (column 1, lines 37-55).

17. It would have been obvious to modify the apparatus of Karellas such that it incorporated a plurality of CCDs, each having a plurality of surfaces that interface with an adjoining CCD. One would have been motivated to make such a modification so that the imaging system is capable of capturing high quality information not possible with singular detection schemes as taught by Karellas (column 1, lines 37-55).

18. As per claim 6, Karellas does not explicitly disclose an apparatus further comprising a processor programmed to correct seam artifacts.

19. Karellas ('034) teaches the use of a processor programmed to correct seam artifacts (column 2, lines 36-39). A benefit of such construction is that it enables a system to produce wide area images based on seamless integration of individual scenes; the resulting image would benefit from error free detail.

20. It would have been obvious to modify the apparatus of Karellas such that it incorporated a processor programmed to correct seam artifacts. One would have been motivated to make such a modification so that the production of a wide area image is quality enhanced through the elimination of deleterious artifacts as taught by Karellas (column 2, lines 36-39).

21. As per claims 7-11 and 25, Karellas as modified, discloses an apparatus comprising a radiation source and image sensor in fixed relationship to one another; an image sensor possessing a plurality of pixels having first and second sizes; a processor for combining data into groups and a display for displaying representative information (see Figs. 1 (above) and 2,3,6,7 not shown above).
22. As per claims 12 and 14, Karellas as modified, does not explicitly disclose an apparatus wherein the image sensor comprises an array of 2048 x 2048 pixels or wherein the scintillator has a variable thickness.
23. It would have been obvious to further modify the apparatus of Karellas such that it incorporated an image sensor comprising an array of 2048 x 2048 pixels and wherein the scintillator has a variable thickness. One would have been motivated to make such a modification so that a larger region of interest could be captured using a larger dimensioned imaging array and for regulating the direct interaction of x-rays with corresponding detector elements (Karellas '394- column 9, lines 42-62).
24. As per claims 15, 16 and 27-29, Karellas as modified, discloses an apparatus and method wherein the controller bins groups of pixels during readout and the sensor performs pixel binning (Karellas '394- column 6, lines 5-16).
25. As per claim 18, Karellas as modified, does not explicitly disclose an apparatus wherein diagnostic characteristics include one of ejection fraction, degree of stenosis or stent position.
26. It would have been obvious to modify the apparatus of Karellas such that it incorporated the above limitations. One would have been motivated to make such a modification so that parameters relating to cardiac function are utilized to determine cardiac performance.

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27. As per claim 24, Karellas as modified, discloses a method wherein images are produced in less than 60 seconds after directing x-rays through a patient (Karellas '394- column 8, lines 52-60).

28. As per claim 26, Karellas as modified, discloses a method further comprising forming an image having a resolution of at least 1 mm (Karellas '394- column 15, lines 9-14).

***Conclusion***


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Courtney Thomas whose telephone number is (703) 306-0473. The examiner can normally be reached on M - F (9 am - 5 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on (703) 305 3492. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0530.

Courtney Thomas

April 16, 2003

  
COURTNEY THOMAS  
EXAMINER  
TELEPHONE 306-0473  
FAX 306-0473